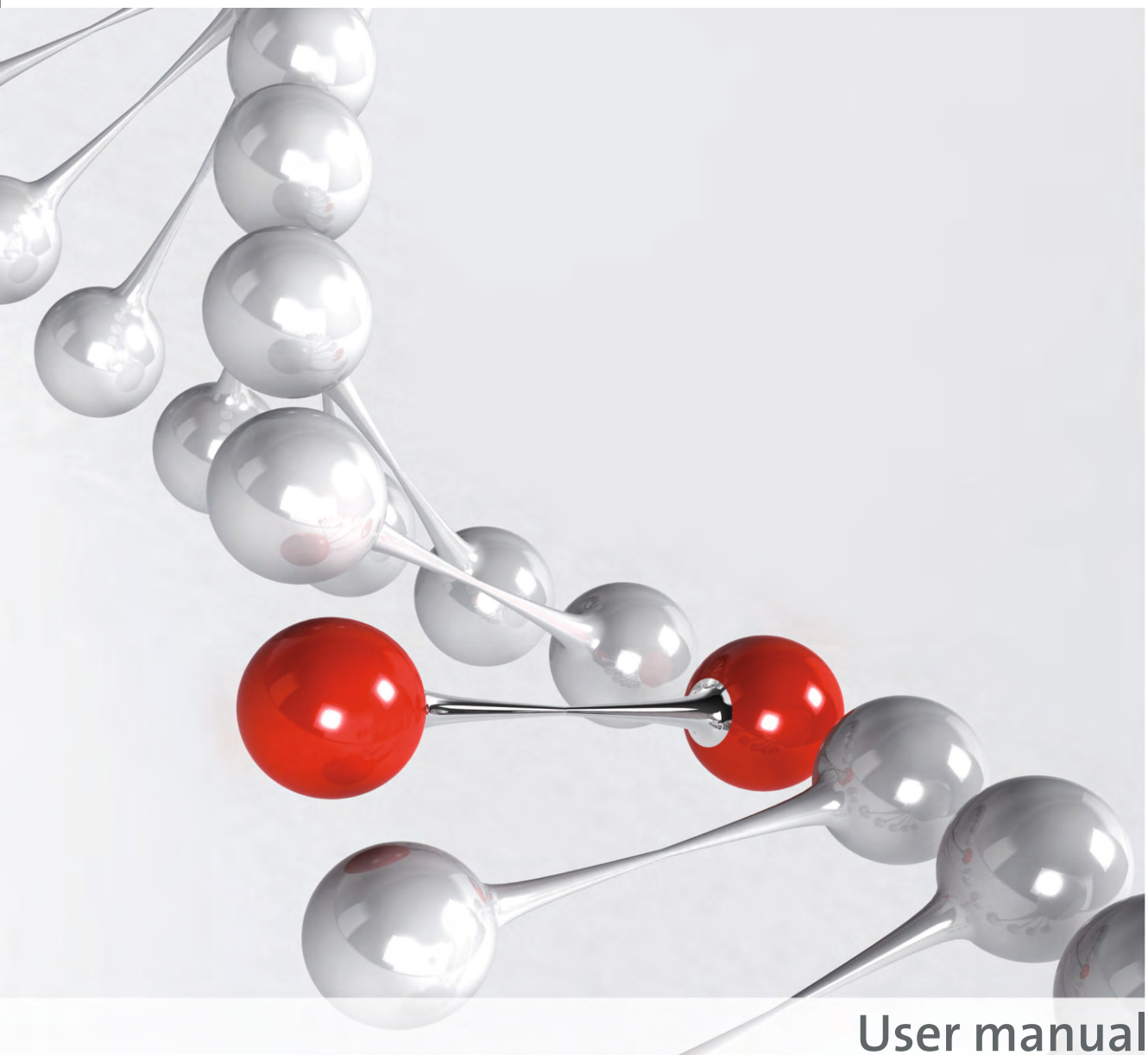
stratec
molecular



User manual
InviMag® Blood DNA Giga Kit/ IG

for use on the InviGenius®, STRATEC Molecular GmbH

for automated purification of DNA from 4 ml whole blood samples with magnetic beads

REF 2431320400 STRATEC Molecular GmbH, D-13125 Berlin

Instruction for InviMag® Blood DNA Giga Kit/ IG

The **InviMag® Blood DNA Giga Kit/ IG** combines the advantages of the innovative Invisorb® technology with easy handling of magnetic particles in combination with the InviGenius® robotic platform for a very efficient and reliable isolation of nucleic acids with a high purity.

The **InviMag® Blood DNA Giga Kit/ IG** is the ideal tool for a walk-away automated isolation and purification of highly pure total (genomic and mitochondrial) DNA from 4 ml whole blood samples (EDTA or citrate stabilized *but not heparin*). The kit is designed for an optimal use on the InviGenius® workstation. The interplay of the DNA extraction and purification chemistry provided by the **InviMag® Blood DNA Giga Kit/ IG** was intensely tested and validated.

The DNA-binding magnetic particles are characterized by a high surface area, a uniform size distribution, and good suspension stability and are therefore highly suitable for high throughput processing.

Due to the high purity, the isolated DNA is ready to use for a broad panel downstream applications or can be stored at –20°C for subsequent use.

The kit is neither validated for the isolation of genomic DNA from cultured or isolated cells, from tissue, blood cards, dried blood stains, urine. The application of the kit for isolation and purification of viral DNA has not been evaluated.

For research use only!

Trademarks: InviMag®, Invisorb®, InviGenius®. Registered marks, trademarks, etc. used in this document, even when not specifically marked as such, are not to be considered unprotected by law.

The Invisorb® technology is covered by patents and patent applications: US 6,110363, US 6,043,354, US 6,037,465, EP 0880535, WO 9728171, WO 9534569, EP 0765335, DE 19506887, DE 10041825.2, WO 0034463.

InviMag®, Invisorb® and InviGenius® are registered trademarks of STRATEC Biomedical AG.

The PCR process is covered by US Patents 4,683,195, and 4,683,202 and foreign equivalents owned by Hoffmann-La Roche AG.

© 2015 STRATEC Molecular, all rights reserved.

Table of contents

Kit contents of InviMag® Blood DNA Giga Kit/ IG	**3**
Symbols	**4**
Storage	**4**
Quality control	**4**
Intended use	**5**
Product use limitation	**5**
Safety information	**6**
Product characteristics of the InviMag® Blood DNA Giga Kit/ IG	**7**
Sampling and storage of starting material	**8**
Principle and procedure	**8**
Yield and Quality	**8**
Important notes	**9**
Preparing reagents and buffers	**9**
Reagents and equipment to be supplied by user	**9**
Important indications	**10**
General overview of the InviGenius® system	**11**
Preparing and loading of the InviGenius® system	**12**
Daily maintenance (UV decontamination)	**20**
Appendix	**21**
General notes on handling DNA	**21**
Troubleshooting	**22**
Ordering information	**23**

Kit contents of InviMag® Blood DNA Giga Kit/ IG

Store the **MAP Solution B** at 2 - 8°C!
Store dissolved **Proteinase K** at –20 °C!
Store all other kit components at room temperature (RT)!

Component	8 x 12 preps	
Catalogue No.	2431320400	
Lysis Buffer HLT	4 x 125 ml	2 runs per bottle
Proteinase K/ IG	For 8 x 2.5 ml working solution	1 vial per run
MAP Solution B/ IG	16 x 3.3 ml	1 vial per 6 samples (for 12 samples load 2 vials into the Invigenius)
Binding Solution (fill with 99.7% Isopropanol)	8 empty bottles (final volume 100 ml)	1 run
Wash Buffer II	4 x 36 ml (final volume 4 x 120 ml)	2 runs per bottle
Elution Buffer M	4 x 60 ml	2 runs per bottle
Incubation Plate D	8	1 run per plate
Working Plate A	8	1 run per plate
Elution Plate E	1	1 runs per plate
Microtube Cap	8	
Sheath Box	1 (2 racks á 48 sheaths)	4 runs per plate
Initial steps	Add 100 ml of 99.7% **Isopropanol** (molecular biologic grade) into each empty bottle Resuspend each lyophilized **Proteinase K** tube by addition of 2.5 ml dd-H_2O and mix thoroughly! Add 84 ml of 96-100% ethanol to the bottle **Wash Buffer II**. Mix thoroughly and always keep the unused bottle firmly closed!	

Please keep in mind, that partially used bottles may be used in other runs. The InviGenius tracks the sample numbers and runs that were extracted with each bottle. MAP Solution B/IG and Proteinase K/ IG may be only used in two runs for quality reason. Minimum sample number left in a MAP Solution B/IG and Proteinase K/ IG Tube is 3 samples due to adequate mixing.

Symbols

Manufacturer

Lot number

Catalogue number

Expiry date

Consult operating instructions

Temperature limitation

Do not reuse

Storage

All buffers and kit contents of the **InviMag® Blood DNA Giga Kit/ IG**, except **dissolved Proteinase K/ IG** and **MAP Solution B/ IG** (magnetic beads), should be stored at room temperature and are stable for at least 12 months at these conditions.

Proteinase K/ IG: Dissolved Proteinase K must be stored at -20°C.

MAP Solution B/ IG: The magnetic bead solution should be stored at 2 - 8°C.

Wash Buffer II: Wash Buffer II charged with ethanol should be stored at room temperature and must be appropriately sealed. If there are any precipitates visible within the provided solutions solve them by carefully warming up to room temperature (up to 30°C)

Room temperature (RT) is defined as range from 15-30°C.

Quality Control and product warranty

STRATEC Molecular warrants the correct function of the **InviMag® Blood DNA Giga Kit/ IG** for applications as described in this manual. Purchasers must determine the suitability of the product for its particular use. If any product fails to perform the application as described in the manual, STRATEC Molecular will check the lot and if STRATEC Molecular detects a problem in the lot, the kit will be replaced free of charge.

STRATEC Molecular reserves the right to change, alter, or modify any product to enhance its performance and design at any time.

In accordance with STRATEC Molecular's ISO 9001-2000 and ISO EN 13485 certified Quality Management System, the performance of all components of the **InviMag® Blood DNA Giga Kit/ IG** have been tested separately against predetermined specifications routinely on lot-to-lot to ensure consistent product quality.

If you have any questions or problems regarding any aspects of **InviMag® Blood DNA Giga Kit/ IG** or other STRATEC Molecular products, please do not hesitate to contact us. A copy of STRATEC Molecular's terms and conditions can be obtained upon request or are presented at the STRATEC Molecular webpage.

For technical support or further information please contact:

from Germany: +49-(0)30-9489-2901/ 2910
from abroad: +49-(0)30-9489-2907 or contact your local distributor.

Intended use

The **InviMag® Blood DNA Giga Kit/ IG** is designed for fully automated extraction and purification of genomic DNA from up to 4 ml whole blood from 1 – 12 whole blood samples using magnetic beads and the InviGenius® instrument.

The nucleic acid isolation protocol is suitable for routinely walk-away automated preparation of DNA from fresh or frozen blood samples. For reproducible and high yields an appropriate sample storage is essential (see “Sampling and storage of the starting material”, page 13).

Common blood collection tubes (not provided) and anticoagulants (EDTA and citrate, *but not heparin*) can be used to gather a set of blood samples. All utilities (reagents and plastics, besides filter tips) necessary for preparation of total DNA from blood are provided by the **InviMag® Blood DNA Giga Kit/ IG.**

THE PRODUCT IS INTENDED FOR USE BY PROFESSIONALS SUCH AS TECHNICIANS, PHYSICIANS AND BIOLOGISTS TRAINED IN MOLECULAR BIOLOGICAL TECHNIQUES. It is designed to be used with any downstream application employing enzymatic amplification or other enzymatic modifications of DNA followed by signal detection or amplification. Any diagnostic results generated by using the sample preparation procedure in conjunction with any downstream diagnostic assay should be interpreted with regard to other clinical or laboratory findings.

To minimize irregularities in diagnostic results, adequate controls for downstream applications should be used.

Product use limitation

The kit is validated for the use of blood samples only. The isolation of DNA from other sources like stool samples, tissues, bacteria, fungi or viruses was neither tested nor validated. No guarantee in operability is issued with differing starting materials, sample type or change in the procedure.

The included chemicals are only useable once.

Differing of starting material or flow trace may lead to inoperability; therefore neither a warranty nor guarantee in this case will be given, neither implied nor express.

The user is responsible to validate the performance of the product for any particular use. STRATEC Molecular does not provide validation of performance characteristics of the product with respect to specific applications. STRATEC Molecular products may be used in clinical diagnostic laboratory systems conditioned upon the complete diagnostic system of the laboratory after the laboratory has been validated pursuant to CLIA’ 88 regulations in the U.S. or equivalents in other countries.

All products sold by STRATEC Molecular are subject to extensive quality control procedures (according to ISO 9001-2000 and ISO EN 13485) and are warranted to perform as described herein. Any problems, incidents or defects shall be reported to STRATEC Molecular immediately upon detection thereof.

The chemicals and the plastics are for laboratory use only. They must be stored in the laboratory and must not be used for other purposes than intended.

The product with its contents is not suitable for consumption.

Safety information

When and while working with chemicals, always wear a suitable lab coat, disposable gloves, and protective goggles!

Avoid skin contact! Adhere to the legal requirements for working with biological material!

For more information, please consult the appropriate material safety data sheets (MSDS). These are available online in convenient and compact PDF format at **www.stratec.com** for each STRATEC Molecular product and its components. If buffer bottles are damaged or leaking, **WEAR GLOVES, AND PROTECTIVE GOGGLES** when discarding the bottles in order to avoid any injuries.

STRATEC Molecular has not tested the waste generated by the **InviMag® Blood DNA Giga Kit/ IG** procedures for residual infectious materials. Contamination of the waste with residual infectious materials is highly unlikely, but cannot be excluded completely. Therefore, all waste has to be considered infectious and should be handled and discarded accordingly to local safety regulations.

European Community risk and safety phrases for the components of the **InviMag® Blood DNA Giga Kit/ IG** to which they apply, are listed below as follows:

Lysis Buffer HLT

warning

contains guanidine-hydrochloride;

H302-315-319, P280-305+351+338

Proteinase K

danger

H315-319-334-335 P280-305-351-338-310-405

H315:	Causes skin irritation.
H319:	Causes serious eye irritation.
H334:	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335:	May cause respiratory irritation.
P280:	Wear protective gloves/protective clothing/eye protection/face protection.
P305+P351+P338:	If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses and continue rinsing.
P310:	Immediately call a POISON CENTER or doctor/physician.
P405:	Store locked up.

Emergency medical information can be obtained 24 hours a day from infotrac:

outside of USA: 1 – 352 – 323 – 3500
inside of USA: 1 – 800 – 535 – 5053

Product characteristics of the InviMag® Blood DNA Giga Kit/ IG

The **InviMag® Blood DNA Giga Kit/ IG** is the ideal tool for an efficient and fully automated DNA extraction and purification from fresh or frozen whole blood samples using magnetic beads in combination with the InviGenius® robotic platform.

Starting Material	Yield	Time for preparation	Ratio
Up to 4 ml of fresh or frozen whole blood	20 - 100 µg, depends on the blood sample (storage and source)	about 200 min per run (using 12 samples)	A_{260}:A_{280}: 1.5-2.2

The DNA isolation process is based on the interaction of nucleic acids with silica coated magnetic particles at adapted buffer conditions. The InviGenius® instrument will automatically perform all steps of sample and reagent distribution. The DNA purification procedure is performed without any user intervention, except the initial loading of the system, thus allowing safe handling of potentially infectious samples. Sample cross-contamination and reagent cross-over is effectively eliminated by the automated purification process. The use of unique bar codes for samples and reagents avoids unwanted transpositions.

The InviGenius® instrument uses magnetic rods to transport the DNA-binding magnetic particles through the various extraction phases: lysis, binding, washing and elution. The volume of buffers and other liquids necessary for DNA isolation is reduced to a minimum. Eliminating the direct liquid handling and increasing the automation level results in a fast, reliable and robust technique.

After a sample specific lysis using **Lysis Buffer HLT** and **Proteinase K**, optimal binding conditions are adjusted upon addition of **Binding Solution.** The genomic DNA binds to the simultaneously added magnetic particles and is separated from solution by magnetic rods controlled by the InviGenius® system. Subsequent to seven washing steps of the particle bound nucleic acids, the DNA is finally eluted in **Elution Buffer M**.

Due to the high purity, the eluted total (genomic and mitochondrial) DNA is ready-to-use in a broad panel of downstream applications:

- PCR*, real-time PCR
- Restriction Enzyme Digestion
- HLA Typing
- Southern Blot

For the isolation of DNA from a single blood sample STRATEC Molecular offers the **Invisorb® Spin Blood Mini Kit** or for 8 – 96 samples the **Invisorb® DNA Blood Mini HTS 96 Kits** for use on a centrifuge, vacuum manifold or other robotic station.

For further information please contact: phone +49 (0) 30 9489 2901, 2910 in Germany and from foreign countries phone +49 (0) 30 9489 2907 or ask your local distributor.

Sampling and storage of starting material

For reproducible and high yields, the appropriate sample storage is essential. Yields may be varying from sample to sample depending on factors such as health of the donor, sample age, kind of sample, transport and storage conditions.

Blood
Best results are obtained using fresh blood samples. Mammalian blood samples (stabilized with EDTA or citrate but **not** heparin) can be stored at room temperature (18-25°C) for 2 - 3 hours. For short time storage (up to 24 h) samples should be stored at 4-8°C. For long term storage, we recommend to freeze the samples at -20°C or -80°C. Avoid multiple thawing and freezing cycles of the material before isolating the DNA. Various different primary tubes, blood collection systems (e.g. Sarstedt, Greiner) and anticoagulants (except heparin) can be used to collect blood samples for the **InviMag® Blood DNA Giga Kit/ IG** procedure

STRATEC Molecular will not take responsibility if other sample types than described above are used or if the sample preparation advices are modified

Principle and procedure

The **InviMag® Blood DNA Giga Kit/ IG** procedure comprises following steps:

- lysis of blood cells and protein digestion
- binding of the genomic DNA to the magnetic beads
- washing the bead bound DNA and evaporation of ethanol
- elution of genomic DNA

After lysis the DNA binds to the magnetic beads whereas contaminations and enzyme inhibitors are efficiently removed during the following seven washing steps and highly purified DNA is eluted finally.

Lysis
Samples are lysed a Deep Well Reservoir Plate at elevated temperatures in the presence of **Lysis Buffer HLT** and **Proteinase K**.

Binding of the genomic DNA
After addition of **Binding Solution** and **MAP Solution B** (magnetic beads) to the lysate, the DNA is bound to the surface of the beads.

Removing residual contaminants
Contaminants are efficiently removed while the DNA remains bound to the magnetic beads.

Elution
The DNA is finally eluted in **Elution Buffer M**. The eluted DNA is ready-to-use in different subsequent downstream applications, e.g. for PCR amplification, digestion with restriction enzymes, Southern hybridizations, HLA typing etc.

Yield and quality of genomic DNA

The amount of purified DNA in the **InviMag® Blood DNA Giga Kit/ IG** procedure from whole blood depends on the leucocytes content, the sample source, transport, storage, and age.

Typically, a volume of a 4 ml whole blood sample from a healthy individual with an elevated white blood cell content - ranging from $3x10^6$ to $1x10^7$ cells/ ml - will yield at least 50 µg of genomic DNA. The typical DNA yield expected from the **InviMag® Blood DNA Giga Kit/ IG** is in the range of 50-100 µg. If a whole blood sample is mixed with anticoagulant containing buffer solutions, the overall leukocyte concentration decreases and the yield of the DNA extraction procedure is slightly reduced.

Important notes

Important points before starting a protocol

Immediately upon arrival of the product, inspect the kit and its components as well as the package for any apparent visible damages and correct quantities. If there are any unconformities, please notify STRATEC Molecular in writing with immediate effect upon inspection thereof. If buffer bottles are damaged, contact the STRATEC Molecular Technical Services or your local distributor. In case of liquid spillage, refer to "Safety Information" (see page 6). Do not use damaged kit components, since their use may lead to poor kit performance.

- When working with chemicals, always wear a suitable lab coat, disposable gloves and protective goggles.
- Discard contaminated gloves immediately
- Do not combine components of different kits
- Avoid microbial contaminations of the kit reagents.
- To minimize the risk of infections from potentially infectious material, we recommend working under laminar air-flow.
- This kit should only be used by trained personnel.

Preparing reagents and buffers

Before starting a run, equilibrate all reagents at room temperature. Where necessary, gently mix and redissolve any precipitates by incubating them at 30°C. Swirl gently to avoid foaming.
Lysis Buffer HLT and **Elution Buffer M** are ready-to-use.

8 x 12 DNA-extractions
Add 100 ml of 99.7% **Isopropanol** (molecular biologic grade) into each empty bottle labelled with "Binding Solution"
Resuspend lyophilized **Proteinase K** by addition of 2500 µl dd-H_2O, mix thoroughly and store diluted **Proteinase K** at –20°C.
Add 84 ml of 96-100% ethanol to the bottle Wash Buffer II. Mix thoroughly and always keep the bottle firmly closed!

Reagents and equipment to be supplied by user

- Measuring cylinder (250 ml)
- Conductive pipette tips
- Disposable gloves
- ddH_2O
- Vortexer
- 96-100% ethanol
- Isopropanol*

*The **InviMag® Blood DNA Giga Kit/ IG** is validated with 2-Propanol; Rotipuran >99.7%, p.a., ACS, ISO (Order no. 6752) from **Carl Roth.**

*** Possible suppliers for Isopropanol:**

Carl Roth
2-Propanol
Rotipuran >99.7%, p.a., ACS, ISO
Order no. 6752

Applichem
2-Propanol für die Molekularbiologie
Order no. A3928

Sigma
2-Propanol
Order no. 59304-1L-F

Important indications

1. Minimum volume of samples in primary tubes

The procedure of the **InviMag® Blood DNA Giga Kit /IG** is optimized for the isolation of genomic DNA from up to 4 ml whole blood. We advise to provide at least 4.5 ml blood per sample tube (12mm diameter, use more if a bigger tube diameter is used) to prevent pipetting distribution errors during processing.

2. Sample volume smaller than 4 ml

For samples of a smaller volume than 4 ml, please fill up the blood tube to a volume of 4.5 ml using 1x PBS.

3. Elution volume

The final processed elution volume is 400 µl or 800 µl.

Typically, 800 µl eluate results in app. 50-100 µg of DNA. Lower or higher DNA contents of human blood are possible due to the nature of blood.

General overview of the InviGenius® system

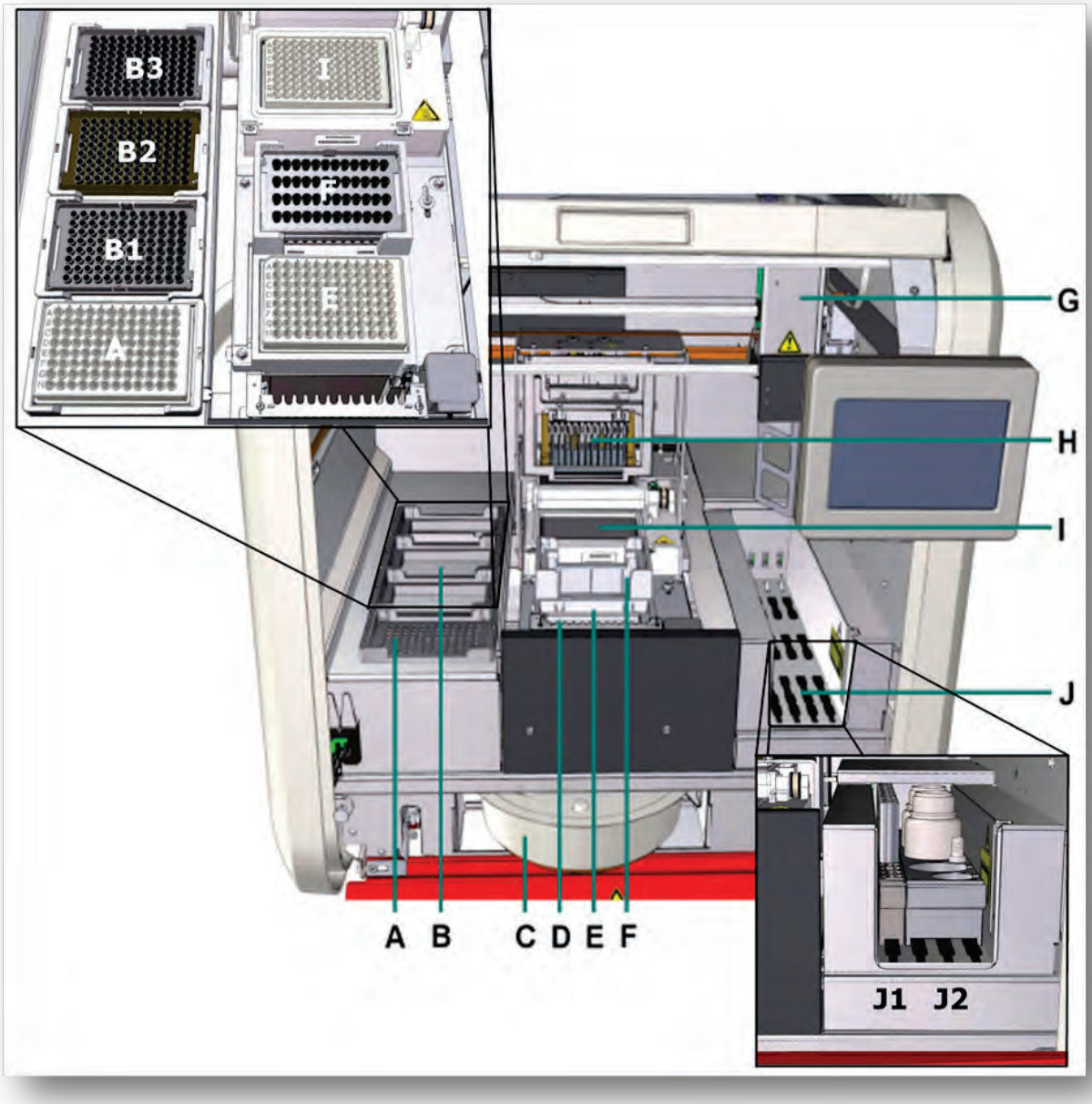


Figure 1: Frontal view of the InviGenius® system

Figure 1 shows the plate positions **A** (elution position), **E** (working position) and **I** (incubation position). Disposable tips are placed on position **B1-B3** and disposable sheaths on **F**. The waste tray **C** is located on the lower side of the InviGenius® system behind the red flap. The waste shaft **D** is completely stainless steel and easy to remove for autoclaving.

The loading bay is divided into sample loading bay (**J1**) and reagent loading bay (**J2**). The magnetic separator head (MSH) **H** is located on top of the incubator **I** and can reach all necessary positions. The single head pipettor **G** starting positions are in the right front of the machine. All movable parts only work when the InviGenius® machine is closed and locked.

Preparing and loading of the InviGenius® system

Preparing the reagents:

Before you start, dissolve one vial of Proteinase K with 2500 µl of distilled water.

Preparing the system:

Switch on the InviGenius® system using the power switch located at the right side of the back part of the instrument. The InviGenius® software will be automatically loaded after the system has booted up. Please keep the door of the InviGenius® system closed during system initialization.

After successful initialization of the InviGenius® system, a login screen appears (Figure 4). Log-in using the provided user name and password.

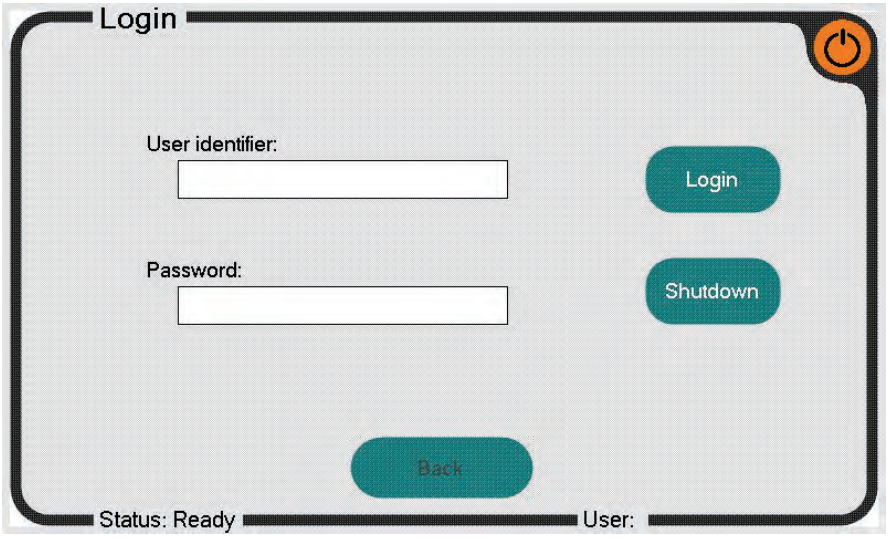


Figure 4: Login screen of the InviGenius® software

After successfully logged-in, the main screen of the InviGenius® software appears (Figure 5). Select “Loading” to start with the loading of the system. Select “Processing” to define and run an assay if the system has been already loaded.

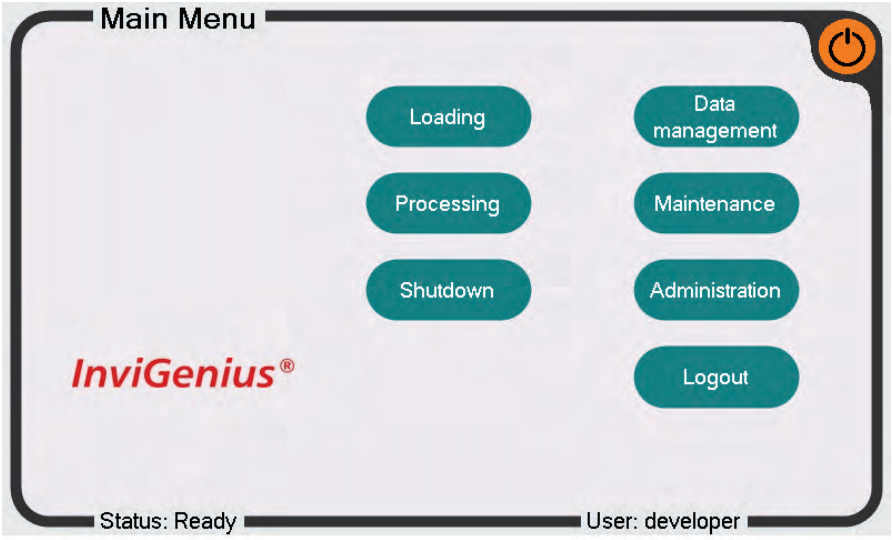


Figure 5: Main menu of the InviGenius® software

Sample Loading:

After selecting “Loading” the sample loading screen appears.

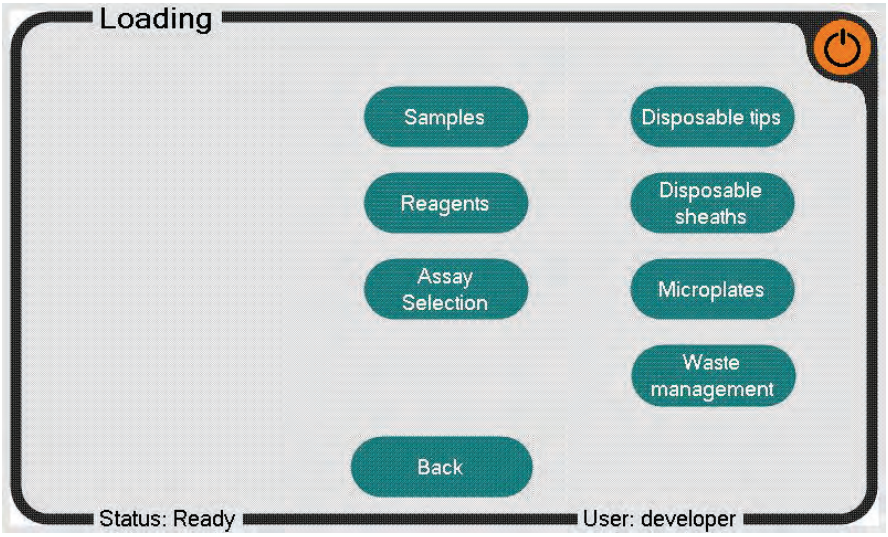


Figure 6: Loading screen of the InviGenius® software

Select “Samples” to proceed with the sample-loading-screen.

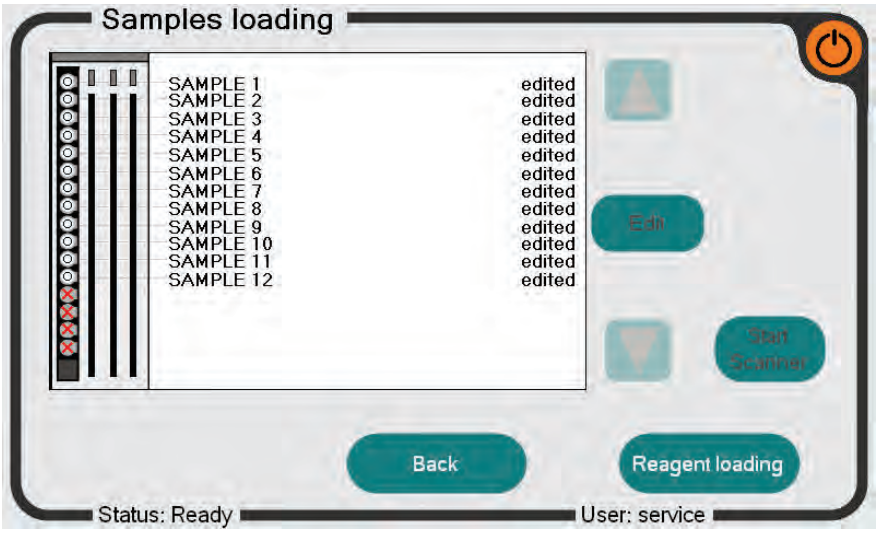


Figure 7: “Sample-loading” screen of the InviGenius® software

Please prepare the sample rack using your own primary tubes that are prefilled with blood samples from which the genomic DNA shall be extracted. Sample tubes are not provided with the kit. The person in charge should directly use primary tubes provided from the blood collection center or blood bank, etc. In case there are no primary tubes available, sample tubes can be ordered at Sarstedt (Order no. 55.476, 5 ml tubes, 75x12 mm, PS).

For each reaction a sample volume of 4 ml is processed. However, we recommend that the total provided sample volume should be at least 4.5 ml to ensure stable processing. If primary tubes completely filled with blood are used, please premix the tube to ensure a homogenous solution before inserting the tube into the sample rack. Do not forget to decap all tubes. Please take care, that only 12 positions of the sample rack can be processed per run due to the limited number of wells per row of the plastic ware. For correct identification of the sample tubes, the unique bar codes – supplied within the kit - must face to the bar code scanner window located at the right side of the loading bay.

After inserting the sample rack in the very left lane of the loading bay, an updated screen will show the identifiers read from the sample bar codes (Figure 7). In case of unsuccessful sample

identification, remove the rack, check the bar code orientation, and reinsert the rack slowly. It is also possible to rename the samples by selecting the corresponding sample by using the arrow fields, followed by the “Edit” button.

After a certain time (about 5 min) the bar code scanner is inactivated. In that case the user has to restart the scanner with the “START SCANNER” button if the loading procedure is not finished.

After successful loading of the samples proceed with reagent loading by selecting “Reagent loading” on the bottom right hand side of this screen.

Reagent Loading:

The reagent loading process is analogous to the sample loading procedure.

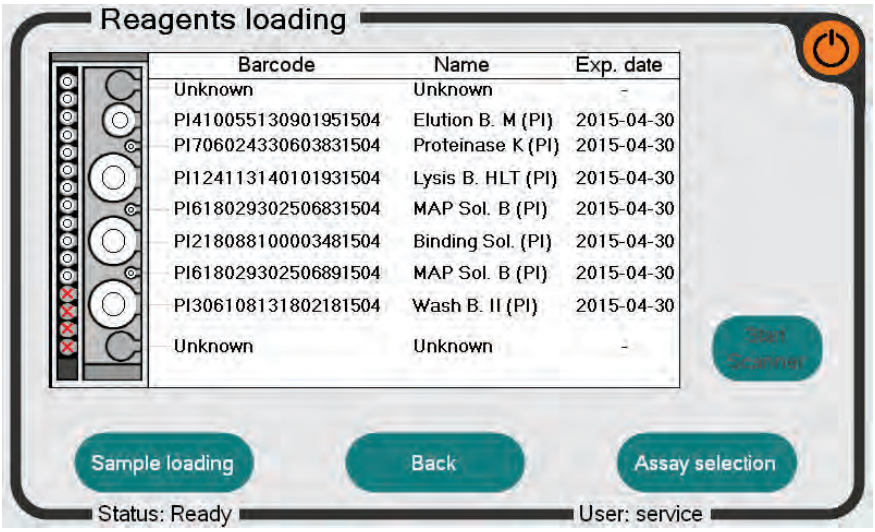


Figure 8: “Reagent-loading” screen of the InviGenius® software

Insert all provided reagents into the provided reagent rack of the InviGenius® system. Take care that the bar code labels face to the right side of the loading bay and decap the bottles and tubes. The order of the inserted reagents is not crucial because the type and position of a reagent is identified by the unique bar code. However, the possible loading positions are limited by the size of the used bottles.

After rack insertion the loading status of the reagents will be shown. In case of unsuccessful reagent allocation, remove the rack, check the bar code orientation and repeat the procedure slowly.

Assay Selection

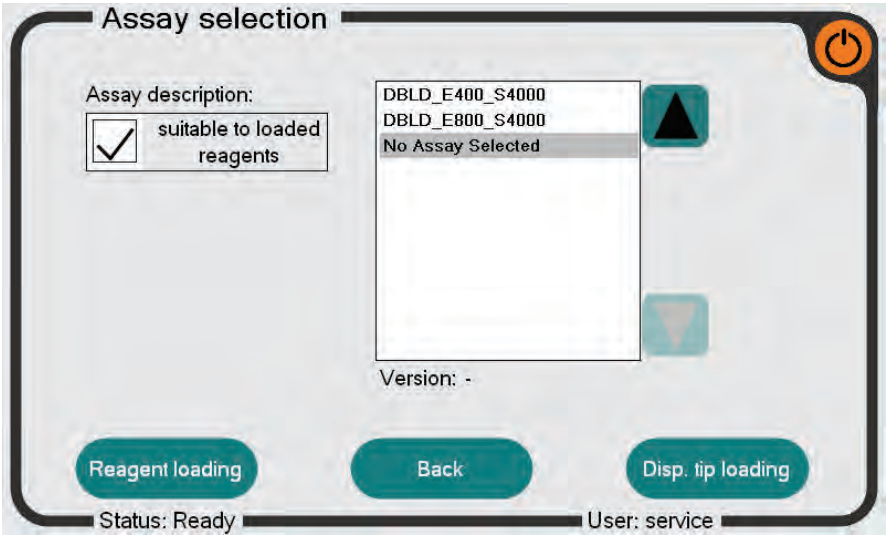


Figure 9: "Assay Selection" screen of the InviGenius® software

Choose the appropriate protocol and proceed with disposable tip loading.

Disposable Tip Loading:

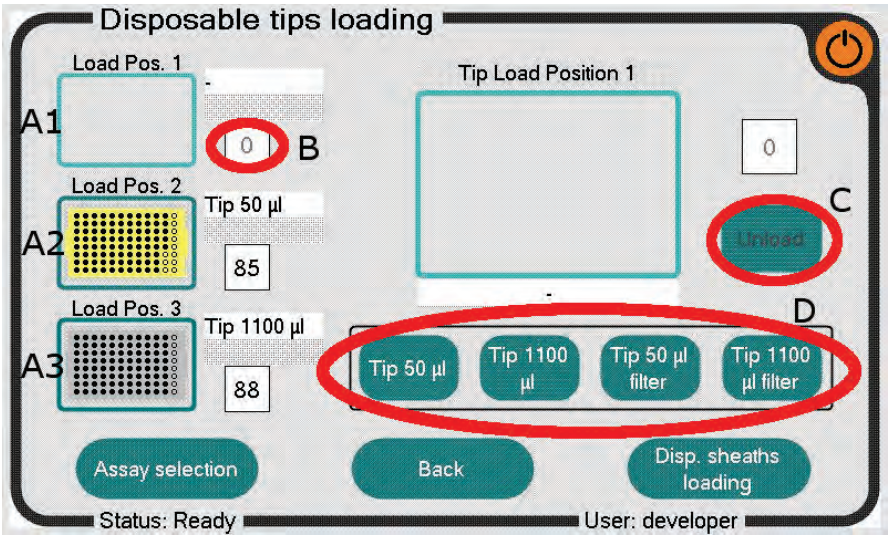


Figure 10, Disposable tip loading screen

There are three tip rack positions on the InviGenius® system (Fig. 10, A1-A3; corresponding to Fig. 3, D1-D3). Remaining tip-numbers are shown in B. Tip-numbers can be changed by pressing the number-field directly.

Empty tip-racks can be unloaded and reloaded by:

1.) Pressing the Loading-Position directly (The software will focus this loading position on the main screen)

2.) Pressing the Unload-Button C

3.) The loading-position can be refilled with a new tip-rack by pressing on the corresponding tip-rack on D

Each position can be filled either with 50 µl or 1100 µl filter or non-filter tips. However, for both Blood Giga assays, only 1100 µl filtered tips will be used.

Attention: ***It is very important to allocate the type of tips correctly in the software that have been loaded into the instrument. In case of false tip allocation, overfilling of the tip will irreparably destroy the pipettor head!***

All protocols should be used in combination with filter tips to ensure efficient prevention of sample or reagent cross-contaminations. STRATEC Molecular will give no guarantee or responsibility if contaminations occur due to the use of non-filtered tips.

Note: ***Disposable tips are not supplied within the kit. We recommend the use of validated conductive tips, which can be ordered at STRATEC Molecular. STRATEC Molecular offers 50 µl conductive tips (10x 96 pieces, order no. 5011120100) and 1100 µl conductive tips (10x 96 pieces, order no. 5011120200). Be sure that conductive tips are used otherwise the tip detection unit, installed in the pipetting unit, will reject the tips and no run will be possible.***

Disposable Sheaths Loading:

The sheaths are used as protection devices for the magnetic rods. They are picked up automatically at the start of the run.

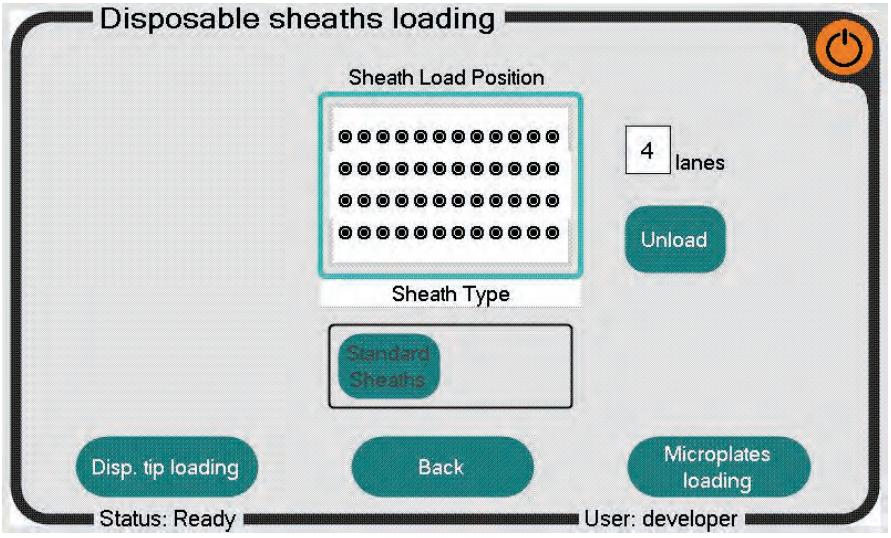


Figure 11, Disposable sheaths loading screen

The loading procedure of the disposable sheaths works analogous to the disposable tip loading screen. For a run, always 12 disposable sheaths (one row in the sheaths rack) are used, regardless of the processed sample numbers. This is done, to assure that the rods are always protected against contaminations.

In general, the number of sheaths supplied within the kit is sufficient for the amount of runs printed on the kit package. If you are lacking sheaths, they can be ordered separately at STRATEC Molecular (100 pieces bulk, order no. 5011120300 or 10 x 48 pieces, order no. 5011120400).

Comparable to the disposable tips loading it is possible to define the number of rows left in the tip rack by pressing on the displayed number area. Make sure that the disposable sheaths are loaded (and displayed) consistent to the manually loaded sheaths in the rack to ensure correct sheaths pick up. Don't remove single disposable sheaths within a row of the sheaths rack if less than 12 samples are processed within one run because there is a sheaths detection sensor installed in the device. If less than 12 sheaths picked up by the instrument a warning will be displayed and all picked up sheath will be discarded into the waste before a next row of sheaths will be picked up for testing.

To avoid contaminations, we strongly recommend to not wash/reuse any disposed sheaths!

Plate Loading:

Analogous to the previous loading screens, the incubation, working and elution positions are loaded within the plate loading screen (Figure 12).

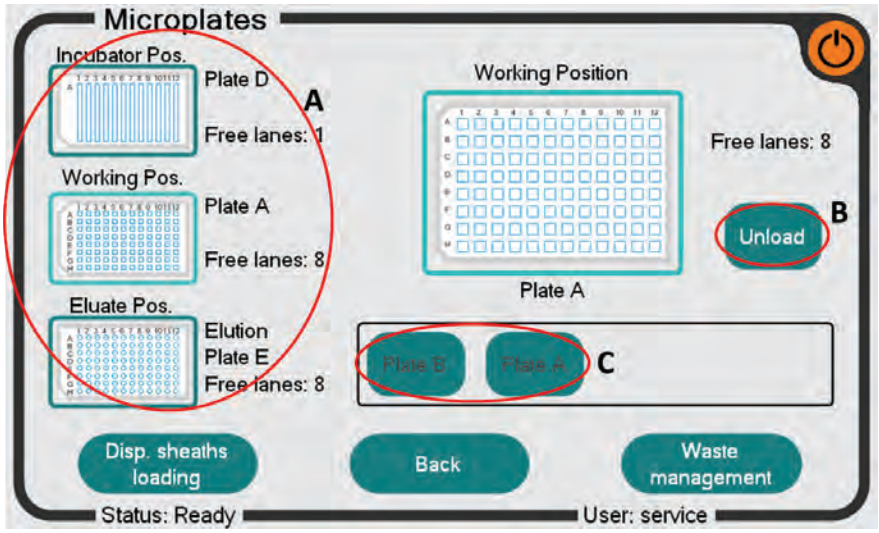


Figure 12, Plate loading screen

In general, the Incubation Plate D is used at the incubator position whereas a Working Plate A is used at working position. At the eluate position the Elution Plate E is used.

Used plates can be unloaded and reloaded by:

1.) Pressing the plate position directly (A). The software will focus at the plate position on the main screen.

2.) Pressing the “Unload” button (B)

3.) The plate can be reloaded by pressing on the offered plate in (C).

For a successful run the InviGenius® needs an empty Incubation Plate D at incubator position, seven free lanes in the working position and one free lane in the eluate position.

Please make sure that the depicted lanes on the monitor are consistent with the real lanes in the corresponding positions.

To avoid contaminations, we strongly recommend to not wash/reuse disposed plates!

Waste management

Please ensure that the waste tray capacity is sufficient for the planned assay. If not, empty the solid waste and renew it if required.

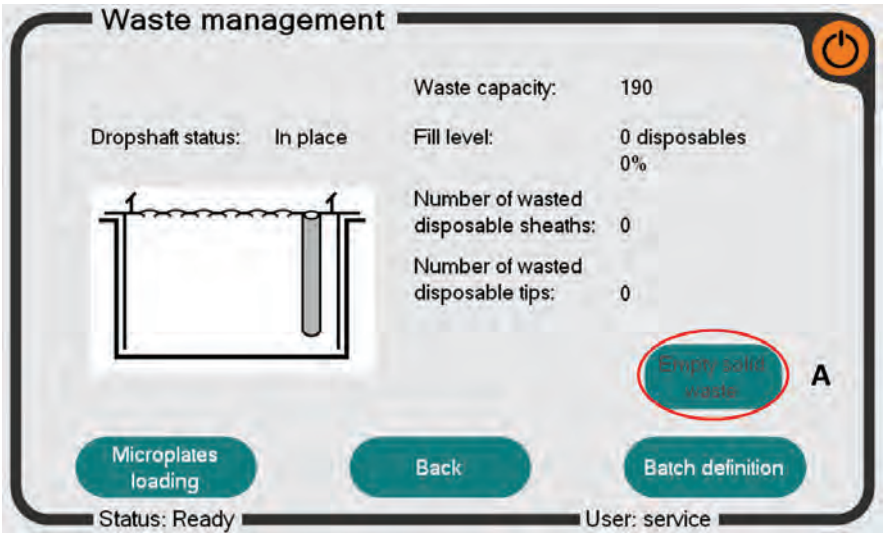


Figure 13; Waste-management-screen

If waste tray has been emptied, please click on the “Empty solid waste” button (A) afterwards.

Batch definition

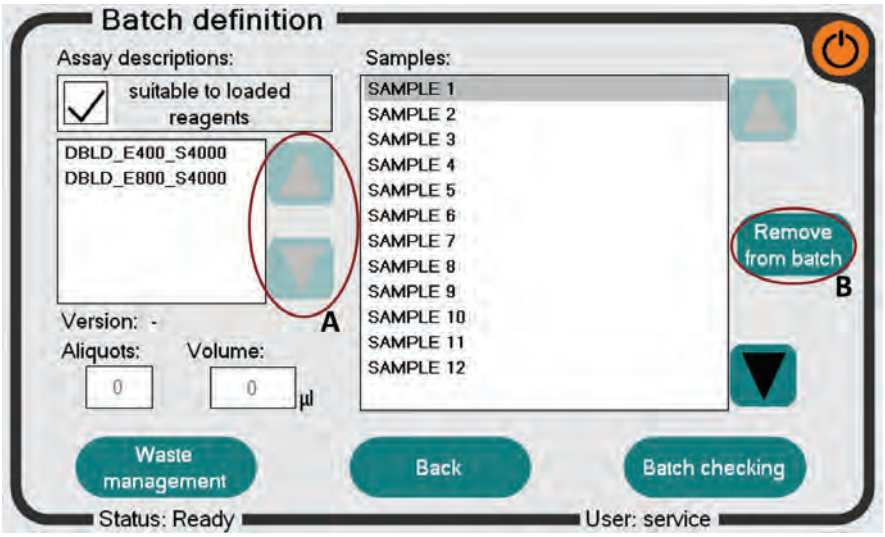


Figure 14; Batch-definition-screen

Please select the desired assay and recheck the allocated samples that should be processed in this run. It is possible to switch between the offered assays by using the two arrow buttons (A).

By default, all loaded samples are selected to be processed in this run. If samples have to be excluded from the batch, exclude them by selecting the corresponding sample and clicking on the “Remove from batch” button (B).

Batch checking

This screen shows a summary of all checked disposables, samples and reagents in one informational screen. Please make sure that all required components are loaded correctly. In case of any error, the problem will be highlighted in by a red font. If no errors during the loading steps occurred, proceed by pressing the button “Batch processing”.

To solve any error, click on the red highlighted field and follow the instructions printed on the instrument screen.

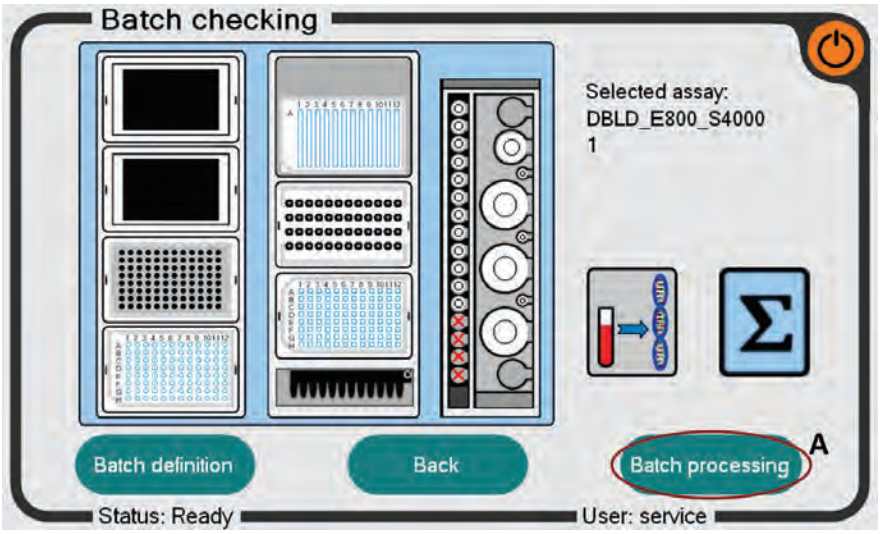


Figure 15; Batch-definition-screen

Batch processing

After closing the system-door, the assay can be started by pressing the “Start”-Button (A). The door will be locked during the run and the system will start with sample processing. The door will only be unlocked after a run has been successfully finished or if an error occurs that requires user interaction. Do not try to force open the door during a run. This will cause an abort of the run!

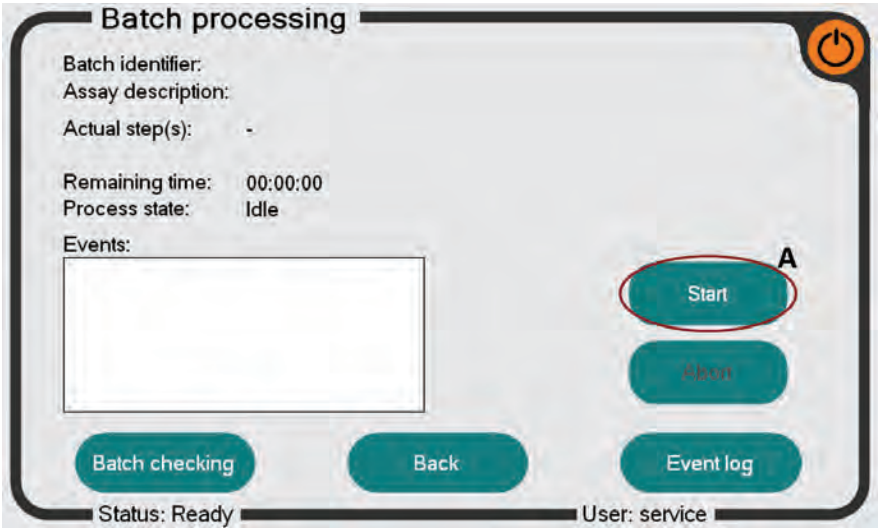


Figure 16; Batch-processing-screen

At the end of the process, the nucleic acid containing eluates are located in the appropriate eluate position and can be used for any further downstream application.

After a run

After a run is completed and no additional run shall be started, unload all plates and reagents and store them according to GLP guidelines. Please keep in mind, that the plates could contain infectious material.

As with all medical/clinical and diagnostically equipment, all waste (liquids, tips, sheaths and plates) should be treated as potentially dangerous bio-hazard waste.

Daily maintenance (UV decontamination)

The InviGenius® system is equipped with an internal UV lamp (254 nm wavelength) that should be used daily either at the end of the working day or in the morning before a run is started. The suggested decontamination time is about 20 min. To start the UV decontamination go to the main menu of the InviGenius software and select “Maintenance”.

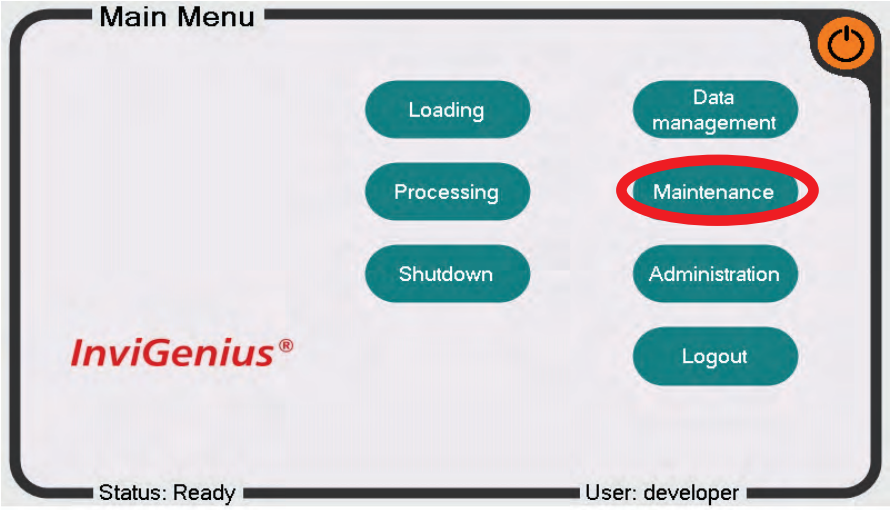


Figure 17: Main screen of the InviGenius® software

When the sub item “Maintenance” is opened, select “UV decontamination”

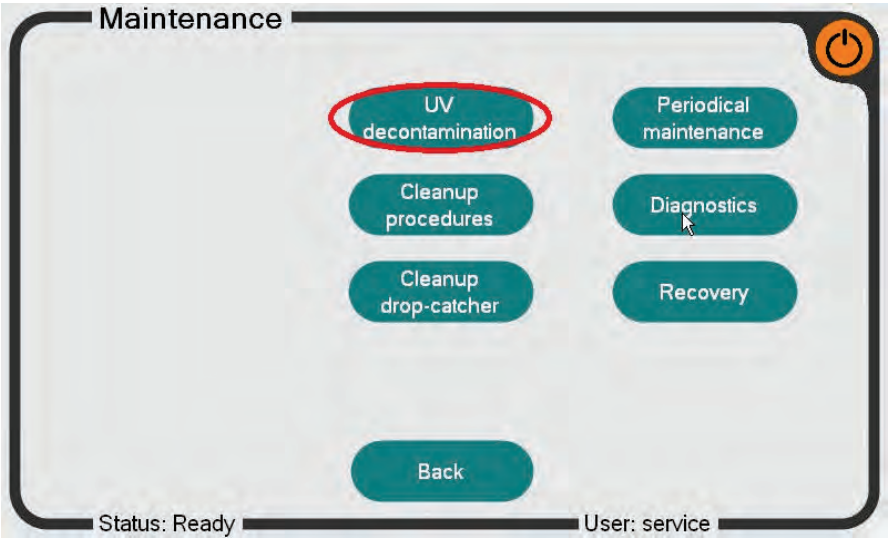


Figure 18: Maintenance screen of the InviGenius® software

In the UV decontamination menu adjust the exposure time (A) and finally press the “Start” button (B). During the decontamination process the instrument door will be locked to prevent any UV radiation release in the lab.

Warning: ***UV radiation is harmful. It causes serious burns of the skin and leads to irreparable damage of the eyes and skin. Ensure that no lab personnel is submitted to direct UV light. Do not try to force open the instrument door during the decontamination process.***

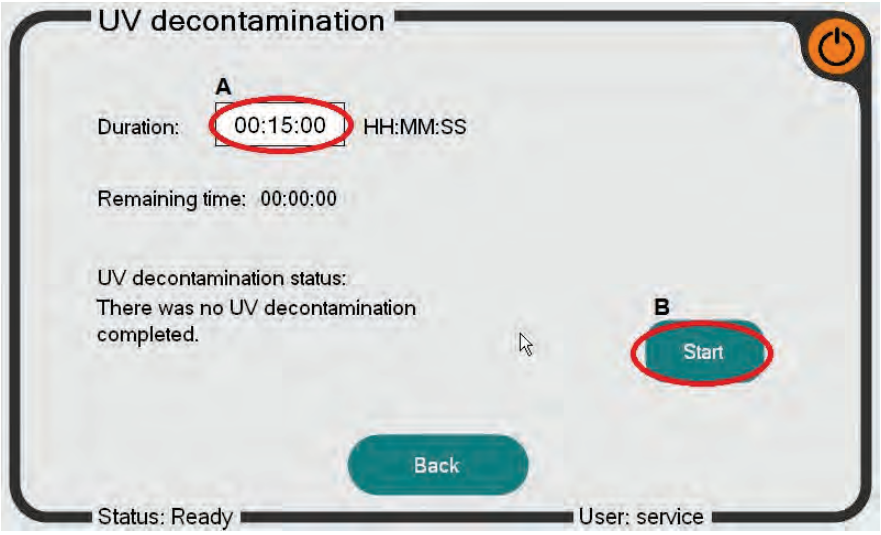


Figure 19: UV decontamination screen

When the decontamination is finished, go back to the main menu by using the “Back” button. The device is now decontaminated and can be either switched off or used for sample processing. We recommend decontaminating the instrument daily.

Appendix

General notes on handling DNA

Nature of DNA

The length and delicate physical nature of DNA requires careful handling to avoid damage due to shearing and enzymatic degradation. Other conditions that affect the integrity and stability of DNA include acidic and alkaline environments, high temperatures, and UV radiation. Careful isolation and handling of high molecular DNA is required to ensure its functionality in various downstream applications. Damaged DNA could perform poorly in applications such as genomic Southern Blots, long-template PCR, and construction of cosmid libraries.

Handling fresh and stored material before the extraction of DNA

For the isolation of genomic DNA use either fresh samples or samples that have been quickly frozen in liquid nitrogen and stored at -70°C. This procedure minimizes degradation of crude DNA by limiting the activity of endogenous nucleases.

Storage of DNA

Genomic DNA should be stored at 2-8°C. Storing genomic DNA at --20°C may cause shearing of DNA, particularly if the DNA is exposed to repeated freezing and thawing cycles. Plasmid DNA and other small circular DNAs can be stored at 2.8°C or at -20°C.

Troubleshooting

Problem	Probable cause	Comments and suggestions
pipetting distribution errors	pipetting of **Proteinase K** failed	ensure that the lyophilized **Proteinase K** is lyophilized with the appropriate volume of water before usage
	samples transfer failed / incomplete	the sample tube must contain at least 4.5 ml sample
	reagent / buffer transfer failed / incomplete	ensure that the supplied **Wash Buffer / Binding Solution** is filled up properly with either ethanol or isopropanol do not reuse bottles more often than described in Tab.1 because they will be rejected by the system
low concentration of extracted DNA	blood components settled	in case of large sample volumes (>>1 ml) carefully premix the sample tube before inserting it into the sample rack
	no/ too much ethanol added to **Wash Buffer**	ensure that the **Wash Buffer** II has been filled up properly with ethanol as indicated in Tab. 1
degraded or sheared DNA	incorrect storage of starting material	ensure that the storage of starting material is correct avoid multiple freezing and thawing cycles of the material
	old material	ensure that the starting material is fresh or stored at appropriate conditions (for long time storage at –20°C)! avoid multiple thawing and freezing cycles of the material old material may contain degraded DNA
no assay selectable	combination of reagents from different kits / missing required reagent	make sure that only and all reagents belonging to one kit type are used. a combination of reagents belonging to different kit types is not supported
eluted DNA is brownish colored	Residual magnetic particles are left in eluate	centrifuge the eluate plate at full speed for 1 min and transfer supernatant to a new plate / tube

Ordering information

Product	Package size	Catalogue No.
InviMag® Blood DNA Giga Kit /IG	8 x 12 preparations	2431320400

Possible suppliers for Isopropanol:

Carl Roth
2-Propanol
Rotipuran >99.7%, p.a., ACS, ISO
Order no. 6752

Applichem
2-Propanol für die Molekularbiologie
Order no. A3928

Sigma
2-Propanol
Order no. 59304-1L-F

InviGenius® and consumables

InviGenius®	1 unit	5011100000
Starting Box I/ IG	1 box	2400110100
Sheath Box		
Conductive filter tips, 1 ml; 2 x 2 rack/ pack (384 pieces)		
5 Waste Trays		
120 sample tubes		
Sheath Bundle	10 x 48 pieces	5011100300
Sheaths	1000 pieces	5011100200
Conductive filter tips, 1 ml	10 x 96 pieces	5011100400
Waste tray/ IG	25 pieces	5011100100
Conductive filter tips, 1 ml	10 x 96 pieces	5011120200
Waste tray/ IG (disposable)	25 pieces	5011120500

stratec molecular

STRATEC Molecular GmbH
Robert-Rössle-Str. 10
13125 Berlin, Germany

Phone: +49 30 94 89 29 01
Fax: +49 30 94 89 29 09
E-mail: info.berlin@stratec.com

www.stratec.com

1G3a04/IG/08/2015